



A REVIEW OF FEATURES AND PERFORMANCE OF IRC (AIM & MESSENGER) AND GROUP SUPPORT SYSTEM

Sukhpreet Kaur¹ | Er. Harpreet Kaur²

¹ Research Scholar, Department of Electronics and Communication Engg., Guru Gobind Singh College of Engg. & Technology, Guru Kashi University, Talwandi Sabo, Bathinda, Punjab, India.

² Assistant Professor, Department of Electronics and Communication Engg., Guru Gobind Singh College of Engg. & Technology, Guru Kashi University, Talwandi Sabo, Bathinda, Punjab, India.

ABSTRACT

IRC (Internet Relay Chat) is a protocol used by people to communicate or deliver messages through networks. IRC offers services to users for real-time text messages through chat groups defined as virtual communities including people with same interests and hobbies. The communication provided by IRC is known as 'Computer-Mediated Communication' where people gathered at one place for conversations. IRC protocol enables its users or clients to connect to IRC servers providing a real-time interface for communicating with people at remote locations throughout the world. However, communication through IRC channels is not secure sometimes. Data security issue could occur while communicating using IRC protocol. Hence, data security is a major concern which needs to be considered to secure the information over IRC channels for hackers. This research focuses on the basic detail of IRC protocol, its architecture, environment, and features. The research is more focused on IRC system to improve its performance by implementing IRC application using new methodology and techniques.

KEY WORDS: IRC.

1. INTRODUCTION

1.1 IRC (Internet Relay Chat)

Internet relay chat is an electronic chat protocol which uses the programs to the device the IRC rules. Internet relay chat is the most popular services on the web which enables numerous communication services to its users. IRC allows the real-time conversations with the people present in the whole planet. IRC enables its users to connect with others through the internet on many websites. People use IRC to chat with other people from all around the world. Many of us use the IRC to keep in touch with the family members, relatives, and the friends. It enables us to contact with the others without inducing the cost of long-distance telephone calls. Some people also use IRC to take knowledge of the various things. For example, Internet relay chat also enables the beginners to learn about the HTML website which brings us the different business opportunities.

The users can hold the group chats with the other users in the real-time sessions by using the internet services. The IRC system includes the two programs – a server and the client. The server in the IRC system relates to the long-running program on the computer system. The client belongs to the short running program it starts the programs when you connect to the server. It joins one or more channels in one lane. In this system, several clients connected to the one server and interfaces with each other.

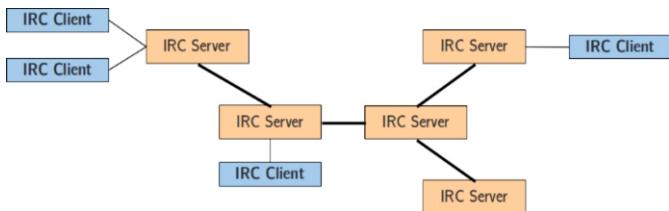


Figure 1: IRC Network

In IRC network, the several open channels are available for freely joined by every user. The message posted by users is promptly shown to all other connected users. This significantly differs from forum users. The IRC broadcast behavior ensures that all users receive single contributed messages while forum users will see messages only within the thread that they can view manually.

1.2 IRC Architecture

The IRC architecture is shown in the below figure. IRC system architecture has three sections which are discussed below:

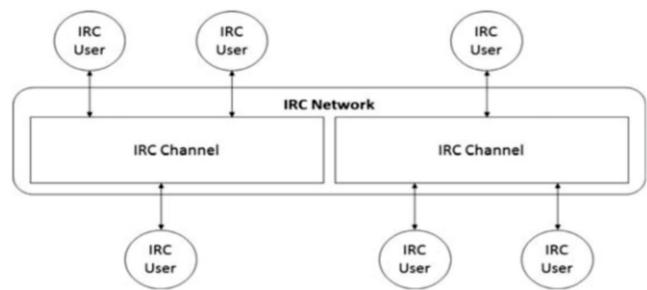


Figure 2: IRC System architecture^[6]

Network: IRC channels are linked with huge networks to share channels, enabling numerous specific servers together and increase the number of chat rooms and its users. Every server in the network is connected with one of the alternate servers in the network and shares all their traffic with each other. Therefore, all connected servers have all messages communicated in the chat rooms [6].

Channels: The channels are the chat chambers which are a text-based framework. Each channel is a virtual space where the connected users with the Internet and IRC can communicate with the other individuals presented on the same channel. A client can utilize another channel, leave the channel and, change the channel whenever required [6].

Client and server: The server repeats the communication with client and channel. It channels and network to convey the messages to the individuals who are in the same chat room. When a user login to the IRC channel with the client application or signs into the server, then the client can set the default program in the settings. A user may join open chat room running on that server. Each message transferred in each chat room is then sent by client application over the network to the IRC server that specifically delivers to each other client connected to that chat room [6].

1.3 IRC Chat Environment

IRC consists of several channels in the network which enables its users to connect with the IRC. There are many IRC systems such as EFNET, IRCNET, DELNET and the NEWNET. The clients run the program to connect to the server in the IRC nets. Each user on the IRC channel is recognized with their nickname. The IRC system provides the nicknames to the users once they are registered. A user can use different channels and communicate with the other users also. There are more than 12000 channels present in the IRC systems.

IRC Chat Environment enables users to join many chat groups simultaneously. The joined group by a client is mentioned below the IRC client-side screen. Clients can switch among different groups by selecting the channel buttons. To agree to the channels, one can utilize the list command which gives a broad list of

channels that are accessible on the IRC. After that, in the IRC frameworks, it's important to hold the channel before you begin the chat with the other client. A channel is depicted as the chat room where the many clients are interfacing with each other and begins the chat. There are multiple channels which are available on the server. After entering the channel, the client composes the messages and presses enter to send it to other clients in the same channel.

1.4 Advantages of IRC [7]

- **Decentralized:** IRC is decentralized which means that no single company is controlling IRC.
- **Privacy:** IRC channel can access complex channel modes.
- **Meeting new People:** Through IRC, people are able to communicate and meet new people all over the world.
- **Flexible and Robust:** IRC allows for real-time discussion with up to hundreds of people at once.

1.5 Disadvantages of IRC [7]

- **Freedom:** It might be difficult to organize and manage chat discussion. It is an open source chat messenger. Any user can easily join the messenger.
- **Informality:** Every person does not understand informal chat in the chat.
- **Chat size:** The length of chat lines is limited.

1.6 Features of IRC

- **Distributed and real time:** IRC brings the people together in real-time at minimal cost across geographical distance. IM appears as an attractive feature that requires more real-time interaction than e-mail. The real-time communication, save time and money.
- **Network Independent:** IRC speeds up the internal and external communication and provides access to independent network communication.
- **E-mail:** It is a primary feature of communication for people today. This feature allows users to send, receive and manage their messages from different format and storage system.
- **Virtual communities:** Its free-flowing conversation, which included web forums.

1.7 Botnets in IRC

A botnet can be defined as a platform used by the cyber attackers to perform several attacks such as Distributed Denial of Service (DDoS) attacks, keylogging, email spamming, and phishing attacks and so on. A botnet is a network of compromised computers that is controlled and maintained by the attacker secretly. In the botnet, each end host is known as Zombie. Each host end is a malicious program which is known as a bot. Every bot is responsible for receiving and execution of instructions that are issued by an attacker through a command and control channel. The attacker who is responsible for controlling the bot network is called bot master or bot herder. The botnets utilize command and control channel as their main components.

The botnets in IRC may initiate by the bot master, which sends the first command. The sequence of actions followed by the zombie in IRC networks are:

- Joining the IRC server.
- Joining the botnet channel.
- Execution of channel topic.
- Keep connection and then wait for bot master commands.

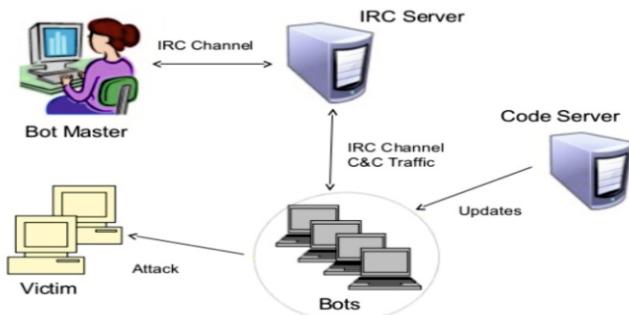


Figure3: Botnet in IRC

The above figure is showing the botnet concept. The bot herder is giving the instruction to the connected botnets clients for exploiting the users. The commands are given using the command and control channel also called C & C as shown in the figure above [14].

1.8 Botnet Detection techniques

There exist several techniques to detect botnets on the IRC network. Various authors described the botnet detection techniques. Some of these are:

- If one is able to detect zombies when they are trying to connect to an IRC server, then IRC network can be prevented from botnets attacks by not allowing that zombie to connect to the IRC server.
- Another way we can use is by considering the similarity of the bot names. This can also help in detecting the bot. If the nicknames are showing similarity, then it may come from the similar bot because normal users' nickname has various styles various a bot master assigns the similar nicknames to their zombies or bots. So similarity can help in bots detection and prevention of attacks.
- It is also possible to detect botnets with the help of mean packet length of IRC packets and IRC messages distribution. If there is much variation, then it may be assign of botnet attacks.
- Botnets can also be detected with the help of AT & T Internet protect sensors which will investigate the hosts that perform suspicious activities and also monitor suspicious traffic. The sensor makes identification of botnets commands, and then these sensors report about this suspicious traffic and hosts to the hub server. Which can prevent the suspicious hosts from joining the IRC network or channel.
- Apart from these methods, a system called Rishi can also be used which will help in detection of botnets. This method uses scoring and regular expression for analyzing the nicknames and based on the analysis detect botnets attacks.

II. OBJECTIVES

IRC is a traditional technology to sending and receiving messages using Messengers or Channels like Facebook Messenger, Yahoo Messenger, and Gmail, etc. These channels were used only for chats or conveying messages to each other. There is needed to be more focus on IRC system to improve and implement their performance using new methodologies. This research will be carried out for the same purpose. The overall objectives of this research are:

- To study and explore the new features of IRC that can be implemented and can result in improved performance of the network.
- Explore the new techniques and methods for the improvement in the IRC channels.
- Implementation of IRC protocol to support multiple channels in the network.

III. FINDINGS

The summary includes the different techniques or methods used to improve the performance of IRC and their corresponding results.

Table 1: Summary of review

Author/Year	Technique	Output
M. N. Sakib and C. T. Huan, [2016]	Anomaly detection based approach	Achieved 90% detection.
M. T. Tolston et al. [2017]	Theoretical Recurrence Analysis	Decrease focus of group conversation.
M. Laskowski and H. M. Kim	Blockchain technology	Utility of blockchain technology
S. K. Bertram, [2016]	Anonymous internet relay chat networks	Re-orientate, the model of social organization
J. Deng, [2016]	Politeness strategies	Brown and Levinson's face theory support
V. Benjamin, et al. [2016]	Extended Cox model	Cybercriminals were identified quickly
M. Sensoy, [2012]	Freenode and ufirc	IRC networks has complex network properties
S. Saiyod et al. [2016]	Snort-IDS rules	Snort-IDS rules should be updated
R. S. Kuzu et al. [2016]	Multiparty chat scenario	75% rank one accuracy
D. Larson, [2016]	Studied Distributed denial of service attacks	Details about the advancement

IV. RESEARCH METHODOLOGY

This research aimed to design an IRC channel prototype for a secure chat through IRC network. The research focused on new techniques and explored new fea-

tures of IRC environment. There are few new features that can be included in the IRC implementation and improvement:

- Check the security of network during the chat.
- Attack alert message would appear on the screen in case of insecure transmission.
- Consume less memory of the client device while transmitting and receiving data.
- Increase the chat block size.

We first analyzed the existing IRC systems to achieve the objectives of this research. Then we tried to improve the performance of these IRC clients using some pre-defined methods or techniques. The results of implementation are shown and discussed in further sections of this paper.

V.CONCLUSION

Security is a most important concern while sending and receiving messages over the network. In this paper, we reviewed the features of IRC network and architecture that must be secured. People want to send and to receive the messages in the group that must be securely supported by the system. Therefore, the implementation of the IRC network in the group support system is the most challenging task. The findings of this paper concluded that the implementation of IRC network is examined in terms of complex network such as small world and scale-free properties. This review found some issues related to the IRC implementation which could be explored and improved for the future communication network.

REFERENCES

- [1] M. N. Sakib and C. T. Huang, (2016) "Using Anomaly Detection Based Techniques to Detect HTTP-based Botnet C&C Traffic," IEEE ICC, Communication and Information Systems Security Symposium
- [2] M. T. Tolston, V. Finomore, G. J. Funke, V. Mancuso, R. Brown, L. Menke and M. A. Riley, (2017) "Effects of Biasing Information on the Conceptual Structure of Team Communications," Springer International Publishing Switzerland, Advances in Neuroergonomics and Cognitive Engineering, Advances in Intelligent Systems and Computing 488.
- [3] M. Laskowski and H. M. Kim, "Rapid Prototyping of a Text Mining Application for Cryptocurrency Market Intelligence."
- [4] S. K. Bertram, (2016) "Authority and Hierarchy within Anonymous Internet Relay Chat Networks," JTR, 6 (3).
- [5] M. Sensoy, (2012) "Internet Relay Chat Networks as Complex Systems."
- [6] D. Larson, (2016) "Distributed denial of service attacks – holding back the flood," ISSN 1353-4858.
- [7] H. S. Kang, H. D. Yang, [2006], "The visual characteristics of avatars in computer-mediated communication: Comparison of Internet Relay Chat and Instant Messenger as of 2003", Int. J. Human-Computer Studies, 64 (2006) 1173–1183.
- [8] J. C. Paolillo, [2001], "language variation on Internet Relay Chat: A social network approach," Journal Of Sociolinguistics, Volume 5, Issue 2 May 2001, Pages 180–213.
- [9] Livadas, C., Walsh, R., Lapsley, D., & Strayer, W. (2006). Using Machine Learning Techniques to Identify Botnet Traffic. Proceedings. 2006 31st IEEE Conference on Local Computer Networks. doi:10.1109/lcn.2006.322210.
- [10] V. Benjamin, B. Zhang, J. F. Nunamaker & H. Chen (2016) "Examining Hacker Participation Length in Cybercriminal Internet-Relay Chat Communities," Journal of Management Information Systems, 33:2, 482-510. H. S. Kang, H. D. Yang, [2006], "The visual characteristics of avatars in computer-mediated communication: Comparison of Internet Relay Chat and InstantMessenger as of 2003", Int. J. Human-Computer Studies, 64 (2006) 1173–1183.
- [11] Raymond B. Jennings III, Erich M. Nahum, David P. Olshefski, Debanjan Saha, Zon-Yin Shae, and Chris Waters, [2006], "A Study of Internet Instant Messaging and Chat Protocols," IEEE Network, 0890-8044/06.
- [12] J. C. Paolillo, [2001], "language variation on Internet Relay Chat: A social network approach," Journal Of Sociolinguistics, Volume 5, Issue 2 May 2001, Pages 180–213.
- [13] W. WANG, B. FANG, Z. ZHANG, C. LI, [2009], "A Novel Approach to Detect IRC-based Botnets," International Conference on Networks Security, Wireless Communications and Trusted Computing, DOI 10.1109/NSWCTC.2009
- [14] P. S. Lokhande & B. B. Meshram (2014). Botnet: Understanding Behavior, Life Cycle Events & Actions, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 3, March 2014 ISSN: 2277 128X.
- [15] Robert Ecker (Linz). Creation of Internet Relay Chat Nicknames and Their Usage in English Chatroom Discourse, Linguistik online, 50, 6/11.
- [16] Sinha, T., & Rajasingh, I. (2014). Investigating substructures in goal-oriented online communities: Case study of Ubuntu IRC. 2014 IEEE International Advance Computing Conference (IACC). doi:10.1109/iadcc.2014.6779445.
- [17] Uthus, D. C., & Aha, D. W. (2013). The Ubuntu Chat Corpus for Multiparticipant Chat Analysis. Artificial Intelligence, 199-200, 106-121. doi:10.1016/j.artint.2013.02.004.